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# U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1259 *rev.*  
*June 1938*

## A SAWFLY INJURIOUS *to* YOUNG PINES



**Y**OUNG PINES, both nursery stock and natural reproduction, are often defoliated by larvae of the red-headed pine sawfly. Defoliation of young pines is usually severe in its effects, killing, misshaping, or weakening the trees to such an extent that attacks of secondary enemies will kill them.

This insect is common on many species of pine throughout the eastern part of the United States and is a constant menace to the better species in nurseries or reforestation areas. It can be controlled in nurseries and parks, when the infestation is heavy, by spraying with lead arsenate at the rate of 2 pounds of the powder to 50 gallons of water; or, if scatteringly present, by hand methods, such as knocking the larvae from the trees and crushing them.

In larger and less-accessible areas, where it would be impractical to attempt control by spraying, rangers and lumbermen should make a practice of destroying the colonies of these larvae whenever they are found.

## A SAWFLY INJURIOUS TO YOUNG PINES

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THE LARVA, or false caterpillar, of an insect known as the red-headed pine sawfly,<sup>1</sup> or Leconte's sawfly, is a serious enemy of pine in nurseries, parks, and reforestation areas in the eastern part of the United States. This insect shows a decided preference for young trees. The effects of defoliation on young pines (figs. 1 and 2), especially before late summer, are usually severe, the part denuded often being killed. Trees not killed are frequently infested by secondary enemies which complete the work; and, if by chance the trees recover, they are stunted or misshapen and of little or no commercial or ornamental value.

### APPEARANCE, LIFE, AND HABITS OF THE INSECT

The needles are eaten by small larvae, one-eighth of an inch long when young to three-fourths or seven-eighths of an inch in length when full grown, which feed in colonies or groups. The young larvae (fig. 3) are pale, whitish to leaden white, and unspotted, with the head brownish; but they change in appearance through a series of molts (five for the male and six for the female), becoming yellowish white with a number of rows of black spots on the body (fig. 4) and with the head dark brown to orange. These larvae have three pairs of legs on the thorax and eight pairs of smaller legs on the abdomen, and the head has only a single pair of eyes, situated one at each side in a rather large, circular, blackish spot.

The larvae feed on the old needles and also on the new needles as they mature, and consequently may defoliate the entire tree. They occasionally feed also on the tender bark (fig. 5) of young twigs. Larvae may be found on trees during most of the summer and fall, since there is more than one brood each season. In the far South it is possible that larvae might be found throughout most of the year.

When full-grown, the larvae spin cocoons from which they emerge later as adults. Adult emergence is divided into two periods, a first



FIGURE 1.—Young western white pine in nursery completely defoliated by larvae of the red-headed pine sawfly.

<sup>1</sup> *Neodiprion lecontei* Fitch; order Hymenoptera, suborder Chalcidostoma, family Tenthredinidae, subfamily Diprioninae.

issuance, brood A, and a second issuance, brood B. When the eggs are laid and hatch in the late spring or early summer, adults of brood A issue from the cocoons in the late summer and early fall of



FIGURE 2.—Young Virginia scrub pine on edge of woods completely defoliated by larvae of the red-headed pine sawfly.

the same year; but adults of brood B from this batch of eggs do not issue from their cocoons until the late summer and early fall of the following year, a complete colony developmental period of 14 months. If the eggs are laid and hatch in the late summer, adults of brood A of these eggs issue from their cocoons in the spring and early summer of the following year, and adults of brood B of the same batch of eggs emerge from their cocoons in the late summer and early fall of the same year as brood A, making a complete colony developmental period of 12 months. (See diagram, fig. 6.)

The cocoons (fig. 7) are spun in the topsoil beneath the infested trees, sometimes as much as several inches underground. The cocoons are tough, papery, reddish-brown capsule-shaped cases, five-sixteenths to seven-sixteenths of

an inch long. The insects pass the winter as larvae in these cocoons.

The adults (fig. 8) are rather robust, four-winged insects. The male is black with reddish-yellow legs and has beautiful feathery feelers, or antennae. The female has the head and first two thoracic segments reddish brown and the third thoracic segment and abdomen black. Her feelers are rather slender and not feathery.

The sawflies get their name from the complicated egg-laying organ of the female. It is well named "the saw," having blades and teeth and being used exactly as a saw when tearing into the leaves in cutting a pocket for the eggs.

The eggs are laid in shoe-shaped pockets, or slits, in the needles. Usually, attacked needles occur in a cluster, each needle bearing a

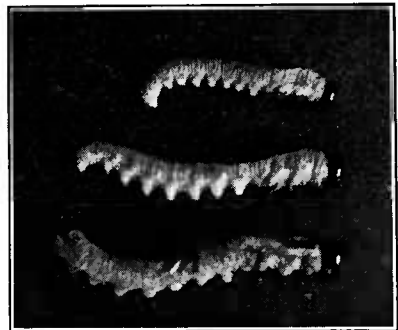


FIGURE 3.—Young larvae of the red-headed pine sawfly, second and third instars. Four times natural size.

number of eggs. The yellowish egg scars, or pockets, are rather easily seen against the dark-green needles (fig. 9).

#### DISTRIBUTION

The red-headed pine sawfly occurs throughout the eastern part of the United States and Canada. In the United States it has been recorded from practically every State east of the Mississippi River, from Maine to Florida and from Minnesota to Louisiana, inclusive, and there is some evidence that this species also occurs in Missouri and Arkansas.

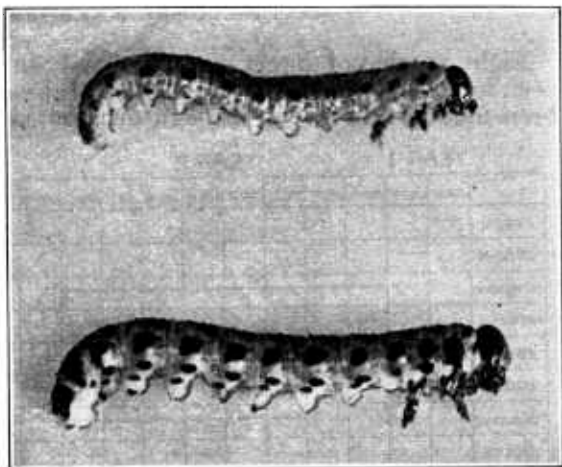


FIGURE 4.—Larvae of the red-headed pine sawfly, fourth and fifth instars. Four times natural size.

#### TREES ATTACKED

This sawfly attacks practically all species of pine. It has been found or recorded on jack pine (*Pinus banksiana*), red pine (*P. resinosa*), Virginia scrub pine (*P. virginiana*), pitch pine (*P. rigida*), loblolly pine (*P. taeda*), longleaf pine (*P. palustris*), shortleaf pine, (*P. echinata*), slash pine (*P. caribaea*), Scotch pine (*P. sylvestris*), Austrian pine (*P. nigra*), mugho pine (*P. montana mughus*), ponderosa pine (*P. ponderosa*), lodgepole pine (*P. contorta*), northern white pine (*P. strobus*), western white pine (*P. monticola*), and tamarack (*Larix laricina*).

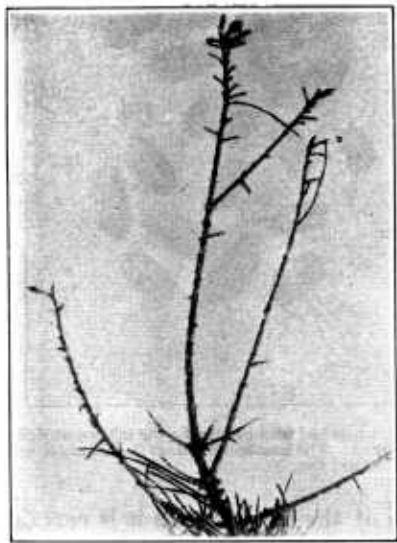


FIGURE 5.—Terminal of young Virginia scrub pine showing defoliation and feeding marks of larvae of the red-headed pine sawfly on bark. Three-eighths natural size.

#### PERIODICAL OUTBREAKS

The red-headed pine sawfly, like most insect enemies of forest trees, appears and disappears periodically. For several years this species will be very abundant, then for a few years it will be rare. The cause for this periodic disappearance has not been determined, but the low records of parasitism indicate that some factor other than parasitism plays an important rôle.

## NATURAL ENEMIES

Eight species of insect parasites and an infectious disease have been found killing this sawfly. None of these enemies, however, have been found to be widely enough distributed or abundant enough to

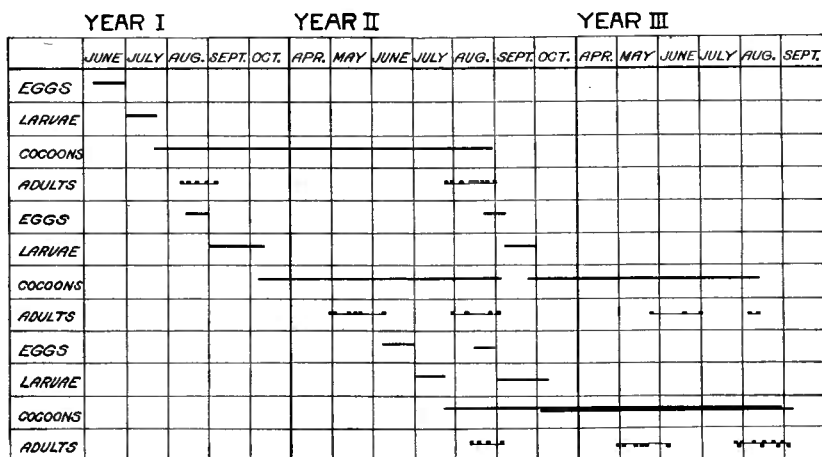


FIGURE 6.—Chart showing life and seasonal history of the red-headed pine sawfly through the active period of 3 years (November to March omitted, the insect being in the cocoon during this period).

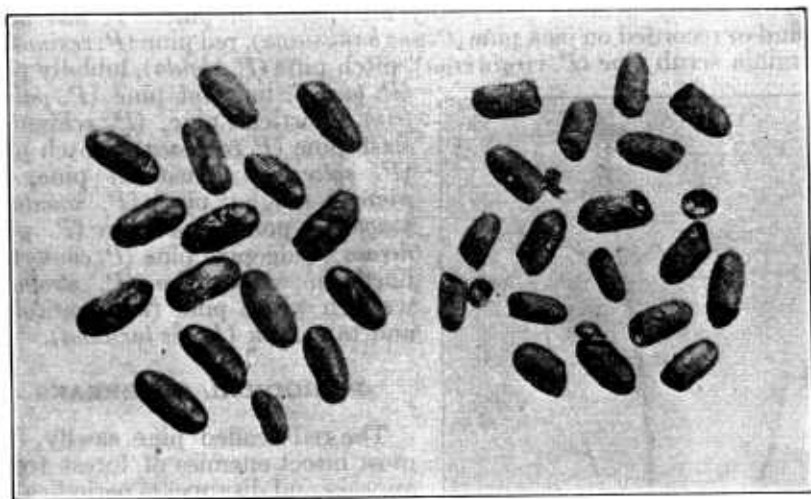


FIGURE 7.—Cocoons of the red-headed pine sawfly: At left, unopened ones containing the insects; at right, those from which adults have issued (emergence holes shown). The females issue from the larger cocoons and the males from the smaller ones. Approximately natural size.

account for the periodic disappearance of the species, and it is certain that neither any nor all of these natural checks are sufficiently numerous or effective to justify disregard of the artificial control measures suggested.

## CONTROL

The control of the red-headed pine sawfly depends largely upon the extent and location of the infestation. In nurseries and parks, when the infestation is heavy, a thorough spraying with a solution consisting of 2 pounds of powdered lead arsenate to 50 gallons of water and

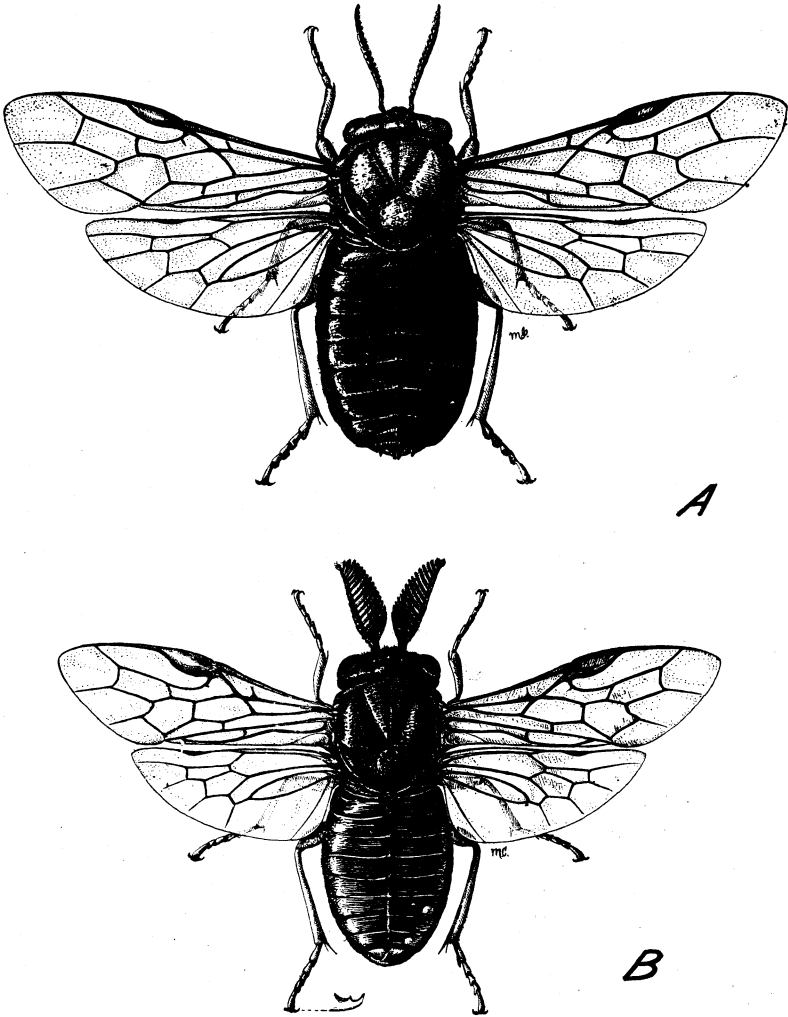


FIGURE 8.—The red-headed pine sawfly: A, Adult female; B, adult male. About 8 times natural size.

one-half pint of either fish oil or linseed oil added as an adhesive (4 ounces of the adhesive for each pound of lead arsenate) will give good results. For small quantities use 9 level teaspoonfuls, or 3 level tablespoonfuls of lead arsenate and 1 teaspoonful of the adhesive to 1 gallon of water in preparing the spray material. Spraying should begin when the larvae are first discovered. In a scattered infestation

hand picking or knocking the larvae from the trees and crushing them will be found more economical and at least as effective.

In large areas of either natural or artificial reproduction control cannot be generally practiced because of its expense, but rangers and

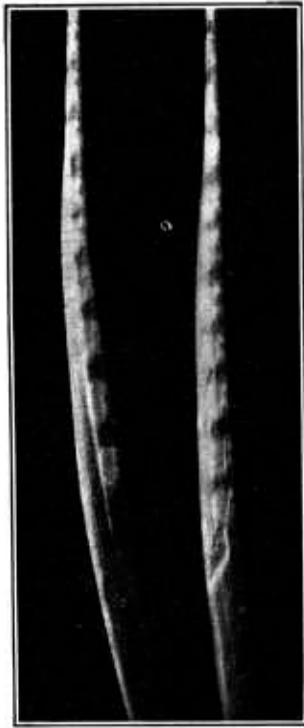


FIGURE 9.—Needles of Virginia scrub pine showing eggs of the red-headed pine sawfly embedded in them.  
About three times natural size.

lumbermen should make it a habit to destroy the colonies of these larvae whenever found.

Whenever these insects are observed in any locality and control measures are practiced against them it is important that the territory be carefully surveyed for the following 14 months, since it is possible that some larvae may have escaped the treatment and spun cocoons. This possibility makes watchfulness necessary over the entire colony period of the species in order that an emergence of adults from these cocoons may not reestablish the infestation.